REMARKS

Claims 1, 2, 8-11 and 48-53 are presently pending in this application. No claims have been amended or cancelled in this response. In the Final Office Action mailed October 12, 2005, claims 1, 2, 8-11 and 48-53 were rejected under 35 U.S.C. § 103(a) over the combination of (a) the information in the Background of the present application ("Background Information"), (b) U.S. Patent No. 6,378,200 to Lim et al. ("Lim"), and (c) U.S. Patent No. 6,071,371 to Leonard et al. ("Leonard").

A. Response to the Section 103(a) Rejection over the Background Information, Lim, and Leonard

Claims 1, 2, 8-11 and 48-53 were rejected under 35 U.S.C. § 103(a) over the combination of the Background Information, Lim, and Leonard. This combination of references cannot support a Section 103(a) rejection of the pending claims because the references fail to disclose or suggest several claim elements as described below.

1. Claim 1 is Directed to a Method for Assembling Microelectronic Dies Including Placing a Base Die on a Substrate and Stacking a First Stacked Die onto the Base Die Before Securing the Base Die to the Substrate in a Heating Cycle

Claim 1 is directed to a method for assembling microelectronic dies including placing a base die on a substrate in a die attach machine so that a front side of the base die with bond pads faces toward the substrate and a backside of the base die faces away from the substrate. The method further includes stacking a first stacked die onto the backside of the base die in the same die attach machine by dispensing an adhesive onto the backside of the base die and placing a backside of the first stacked die onto the adhesive. The first stacked die is stacked onto the base die before securing the base die to the substrate in a heating cycle.

2. The Background Information Discloses Methods for Stacking Dies on Printed Circuit Boards

The Background Information discloses methods for stacking dies on printed circuit boards. The microelectronic dies are typically stacked on each other in a two-

pass process starting with a first pass that mounts a flip-chip die to a substrate and a second pass that mounts a conventional wire-bond die onto the backside of the flip-chip die. The first pass typically involves mounting the flip-chip die to the substrate in a first die attach machine, and then heating the flip-chip/substrate subassembly to reflow solder bumps. The heating process securely attaches the flip-chip to the substrate. After mounting the flip-chip to the substrate, the flip-chip/substrate subassembly is transported to a second die attach machine where it is held for processing in a second-pass. The second pass through the second die attach machine involves (a) dispensing epoxy onto the backside of the flip-chip, and (b) mounting a conventional wire-bond chip to the epoxy. The stacked die assembly is then re-heated to cure the epoxy after the second pass through the second die attach machine.

The conventional two-pass processes for stacking a conventional wire-bond die onto the backside of a flip-chip die typically occur in two different die attach machines. Alternatively, a single die attach machine may be used by mounting the flip-chip die to the substrate in a first pass, heating the mounted flip-chip in a first heating cycle to reflow solder on the flip-chip die, reprogramming the die attach machine to attach the wire-bond dies to the backside of the mounted flip-chip dies in a separate second-pass through the machine, attaching the wire-bond die to an epoxy on the flip-chip die in a second pass through the same die attach machine, reheating the stacked die assembly, and then reprogramming the die attach machine again to mount flip-chip dies to another set of substrates in a new first pass.

3. Lim Discloses a Method of Reconfiguring an Assembly Line for Electronic Products

Lim discloses a method of reconfiguring a production line for fabricating printed circuit board assemblies to achieve maximum efficiency and maximum flexibility. The production line has one or more placement stations, a reflow oven, a conveyer, and a controller. The controller communicates with the placement stations, the reflow oven, and the conveyer to determine the status of these components and adjust the tasks performed by these components. For example, if a first placement station typically performs a first task and a second placement station downstream from the first

placement station typically performs a second task, the controller may move a printed circuit board assembly from the first station to the second station and reconfigure the second station to temporarily perform both the first and second tasks when the second station is idle.

4. Leonard Discloses a Method for Simultaneously Attaching Surface Mount and Chip-On-Board Dies to a Circuit Board

Leonard discloses a method for simultaneously attaching both a surface-mount die (i.e., flip-chip die) and a chip-on-board die (i.e., a wire-bond die) to a circuit board. The surface-mount die and the chip-on-board die are both attached directly to the circuit board and laterally spaced apart from each other. The surface-mount die is attached to the circuit board with a solder joint, and the chip-on-board die is attached to the circuit board with an adhesive. After placing the dies on the circuit board, the assembly is heated to cure the adhesive and reflow the solder.

5. The Background Information, Leonard, and Lim Fail to Disclose or Suggest a Method for Assembling Microelectronic Dies Including Placing a Base Die on a Substrate and Stacking a First Stacked Die onto the Base Die Before Securing the Base Die to the Substrate in a Heating Cycle

The Background Information, Leonard, and Lim fail to disclose or suggest a method for assembling microelectronic dies including, *intra alia*, "placing a base die on a substrate in a die attach machine" and "stacking a first stacked die onto the backside of the base die in the same die attach machine . . . before securing the base die to the substrate in a heating cycle," as recited in claim 1. In the Office Action, the Examiner alleges, "[o]ne skilled in the art would have readily appreciated that the collective teachings of Lim et al and Leonard et al point out the inefficiencies of the admitted prior art and suggest modifying the method of the admitted prior art to" include the claimed combination of features. (Office Action, p. 4.) The undersigned attorney respectfully disagrees for the reasons described below.

One of ordinary skill in the art would not be motivated to modify the Background Information as suggested by the Examiner because (a) the Background Information

explicitly teaches away from such a modification, and (b) Lim and Leonard provide no motivation to modify the Background Information to include the claimed combination of features. The Background Information teaches that it is generally necessary to heat the subassembly of the base die and the substrate before moving or otherwise handling the subassembly to avoid displacing the base die. (Paragraph [0030].) The Background Information further teaches that it was counterintuitive to attach the first stacked die to the base die before securing the base die to the substrate. (Paragraph [0030].) The Background Information accordingly teaches away from stacking a first stacked die onto the backside of the base die before securing the base die to the substrate in a heating cycle.

Moreover, Lim and Leonard do not provide a motivation to modify the Background Information to stack a first stacked die onto the backside of a base die before securing the base die to the substrate in a heating cycle. At best, Lim discloses a method for reassigning tasks to different components in a production line to minimize inefficiencies in the line, and Leonard discloses a method for simultaneously curing two different materials that attach two laterally spaced-apart dies to the same circuit board. Neither of these references mentions stacking dies or curing adhesive materials that couple stacked dies. Accordingly, the current rejection of the pending claims does not comply with Section 103(a) because (a) the Background Information expressly teaches away from stacking a first stacked die onto the backside of a base die before securing the base die to the substrate in a heating cycle, and (b) Lim and Leonard do not provide a motivation to modify the Background Information to include this claim feature. Therefore, the Section 103(a) rejection of claim 1 should be withdrawn.

Claims 2, 8, 9, 48 and 49 depend from claim 1. Accordingly, the Section 103(a) rejection of claims 2, 8, 9, 48 and 49 should be withdrawn for at least the reasons discussed above with reference to claim 1 and for the additional features of these claims.

Independent claim 10 has, *inter alia*, features generally analogous to the features of claim 1. Accordingly, the Section 103(a) rejection of claim 10 should be withdrawn

for at least the reasons discussed above with reference to claim 1 and for the additional features of claim 10.

Claims 11 and 50-53 depend from claim 10. Accordingly, the Section 103(a) rejection of claims 11 and 50-53 should be withdrawn for at least the reasons discussed above with reference to claim 10 and for the additional features of these claims.

B. Conclusion

In view of the foregoing, the pending claims comply with 35 U.S.C. § 112 and are patentable over the applied art. The applicants accordingly request reconsideration of the application and a Notice of Allowance. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to call David Dutcher at (206) 359-6465.

Respectfully submitted,

Perkins Coie LLP

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David T. Dutcher
Registration No. 51,638

Correspondence Address:
Customer No. 25096
Perkins Coie LLP
P.O. Box 1247
Seattle, Washington 98111-1247
(206) 359-8000